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## خلاصه مقاله:

Background: Presurigical planning for glioma tumor resection and radiotherapy treatment require proper delineation of tumoral and peritumoral areas of brain. Diffusion tensor imaging (DTI) is the most common mathematical model applied for diffusion weighted MRI data. Neurite orientation dispersion and density imaging (NODDI) is another mathematical model for DWI data modeling.Objective: We studied whether extracted parameters of DTI, and NODDI models can be used to differentiate between edematous, tumoral, and normal areas in brain white matter (WM).Material and Methods: ۱۲ patients with peritumoral edema underwent ۳T multi-shell diffusion imaging with b-values of ۱۰۰۰ and ۲۰۰۰ smm-۲ in ۳۰ and ۶۴ gradient directions, respectively. We fitted DTI and NODDI to data in manually drawn regions of interest and used their derived parameters to characterize edematous, tumoral and normal brain areas.Results: We found that DTI parameters fractional anisotropy (FA), mean diffusivity (MD), axial diffusivity (AD) and radial diffusivity (RD) all significantly differentiated edematous from contralateral normal brain WM (p<۰.۰۰۵). However, only FA was found to distinguish between edematous WM fibers and tumor invaded fibers (p = ۰.۰۰۱). Among NODDI parameters, the intracellular volume fraction (ficvf) had the best distinguishing power with (p = ۰.۰۰۱) compared with the isotropic volume fraction (fiso), the orientation dispersion index (odi), and the concentration parameter of Watson distribution (Îº), while comparing fibers inside normal, tumoral, and edematous areas.Conclusion: The combination of two diffusion based methods, i.e. DTI and NODDI parameters can distinguish and characterize WM fibers involved in edematus, tumoral, and normal brain areas with reasonable confidence. Further studies will be required to improve the detectability of WM fibers inside the solid tumor if they hypothetically exist in tumoral parenchyma.

## کلمات کلیدی:
MRI, NODDI, Diffusion tensor imaging, Edema, Brain Tumor